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BEFORE THE BOARD OF PATENT APPEALS AND INTERFERENCES

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Technology Center 2600

Application Number: 10/711,189
Filing Date: August 31, 2004
Appellant(s): SIROHEY ET AL.

John F. Buckert

For Appellant

EXAMINER'S ANSWER

This is in response to the appeal brief filed 11/9/07 appealing from the Office action mailed 6/14/07.

The Real Party in Interest is contained in the brief.

(2) Related Appeals and Interferences

The examiner is not aware of any related appeals, interferences, or judicial proceedings which will directly affect or be directly affected by or have a bearing on the Board's decision in the pending appeal.

(3) Status of Claims

The statement of the status of claims contained in the brief is incorrect. A correct statement of the status of the claims is as follows:

Claims 2-5, 7-15, 27-30 and 32-41 are objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

(4) Status of Amendments After Final

No amendment after final has been filed.

(5) Summary of Claimed Subject Matter

The summary of claimed subject matter contained in the brief is correct.

(6) Grounds of Rejection to be Reviewed on Appeal

The appellant's statement of the grounds of rejection to be reviewed on appeal is substantially correct. The changes are as follows: The following grounds of rejection are not

presented for review on appeal because they have been withdrawn by the examiner: the rejection of claims 2, 4, 27 and 29 under 35 U.S.C. 103(a) as being unpatentable over Takagi et al.(US Patent 6,269,140) in view of Claus et al.(US Patent Pub. 2005/0135558) in further view of Brandl et al.(US Patent 6,450,962), and of claims 3, 5, 7-15, 28, 30 and 32-41 under 35 U.S.C. 103(a) over Takagi in view of Claus, in further view of Brandl and in further view of Yao et al.(hereinafter "Yao", US Patent Pub. 2005/0078858).

(7) Claims Appendix

The copy of the appealed claims contained in the Appendix to the brief is correct.

(8) Evidence Relied Upon

6,269,140	TAKAGI ET AL.	07-2001
6,450,962	BRANDL ET AL.	09-2002
6,522,712	YAVUZ ET AL.	02-2003
2003/0188757	YANOF ET AL.	10-2003
2005/0078858	YAO ET AL.	04-2005
2005/0135558	CLAUS ET AL.	06-2005
2005/0201509	MOSTAFAVI ET AL.	09-2005

Caoili, E., Cohan, R., Korobkin, M., Platt, J., Francis, I., Faerber, G., Montie, J., Ellis, J., Urinary Tract Abnormalities: Initial Experience with Multi-Detector Row CT Urography, February 2002, Journals of the Radiological Society of North America (RSNA), Volume 222, Issue 2, pp. 353-360.

(9) Grounds of Rejection

The following ground(s) of rejection are applicable to the appealed claims:

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

Claims 1, 19, 21-26, 43 and 45-50 rejected under 35 U.S.C. 103(a) as being unpatentable over Takagi et al.(hereinafter "Takagi", US Patent 6,269,140) in view of Claus et al.(hereinafter "Claus", US 2005/0135558).

Regarding claim 1, Takagi teaches a method for generating a digital image indicative of an internal anatomy of a person (col. 2 lines 53-56), comprising scanning the internal anatomy of the person at a plurality of positions along an axis to obtain scanning data (col. 3 lines 21-26: "*...a scan control section for controlling drive of the X-ray source...to thereby perform scan on the periphery of the object with the X-rays in a direction of a sliced face crossing a body axis of the object...*"), wherein the scanning at each position is performed over at least one respiratory cycle of the person (col. 3 lines 30-33: "*...and a scan speed control section for receiving an*

electrocardiogram signal of the object to thereby control a rotational speed of the rotary member on the basis of the electrocardiogram signal." and in col. 7 lines 2-21: "*...a signal indicating a breath period of the lung is provided in place of the electrocardiograph 50, and the X-ray scan speed in the lung region is controlled synchronously with the breath period...which performs periodic and repetitive movement.*"), and generating a plurality of cross-sectional digital images based on the scanning data (col. 3 lines 26-30). Though Takagi does not specifically teach generating first and second cross-sectional digital image groups associated with respective first and second respiratory states, the quantity of the cross-sectional digital image groups does not depart from the scope of invention (applicant's Specification: ¶ 0061 lines 1-13), therefore no specific quantity of cross-sectional digital image groups may be generated. Therefore the teachings of Takagi enable generation of first, second, or other subsequent groups of cross-sectional digital images, in which each respective group of images corresponds to a particular respiratory state (col. 6 lines 55-58: "*...to establish a synchronizing relation of phase between the CT scan...and the cardiac pulsation to thereby obtain a plurality of CT images corresponding to one and the same phase of pulsation.*" and in col. 3 lines 42-47: "*...receiving an electrocardiogram signal of the object and controlling a scan speed of the X-rays synchronously with a period of the electrocardiogram signal; detecting the X-rays transmitted through the object every time the scan is performed to thereby collect image information with respect to a sliced face of the object...*"), where each group comprises cross-sectional digital images at respective positions along an axis where each of the digital images indicate the internal anatomy at a substantially similar respiratory state (col. 6 lines 55-58: "*...to establish a synchronizing relation of phase between the CT scan (rotation of the rotary disc) and the cardiac*

pulsation to thereby obtain a plurality of CT images corresponding to one and the same phase of pulsation."), in which a plurality of images are generated for the pulsation, known in the art to include two phases: an inspiration and expiration. Takagi also teaches generating 3-D digital images corresponding with respective cross-sectional digital image groups (col. 6 lines 60-63: "*...a three-dimensional image or a sagittal (coronal) reconstituted image is formed from a plurality of CT images obtained by scan synchronously with the period of the electrocardiographic complex...*"). However, Takagi fails to teach processing the 3-D digital images to obtain a resultant 3-D digital image indicating at least a portion of the internal anatomy of the person. Claus teaches processing the 3-D digital images to obtain a resultant 3-D digital image indicating at least a portion of the internal anatomy of the person (¶ 0014 lines 11-14: "*Once reconstructed, the images produced by the system of FIG. 1 reveal an internal region of interest of the patient 18 which may be used for diagnosis...*", ¶0051 lines 1-10: "*...several reconstructed datasets can co-exist...to...maintain a reconstructed volume for different cardiac states or phases...*", ¶0054 lines 1-6: "*...the volume rendering may be rotated...around the viewing direction...the...viewpoint...defines the viewing angle for three-dimensional rendering.*", and ¶0056 lines 1-3: "*...the three-dimensional image may be viewed from any perspective, it may be useful to rotate the volume rendering to provide the best view...*"), where a generated resultant volume is displayed in a volumetric 3D space, in which rotation of the volume is enabled to provide various 3D views of the related portions of respiratory phases or states that concurrently reside within the resultant volume. Claus also teaches storing all data generated by the computer(36) (Fig. 1), into a memory device (¶ 0015 lines 1-3), therefore the resultant 3-D images (¶ 0051 lines 1-10) would be stored in a memory device. Therefore it would have been

obvious to one of ordinary skill in the art at the time of invention to combine the teachings of Takagi with Claus because this combination would improve the analysis of an internal anatomy of a subject during a respiratory cycle through enabling generation of a 3-D volumetric image associated with the entire respiratory cycle of the subject containing contributions of each phase of the cycle to supply complete analysis of the internal anatomy in a volumetric environment providing several views of the anatomy in a user interface while avoiding visual artifacts caused by movement or displacement of the subject.

Regarding claims 19 and 43, Takagi teaches that the plurality of cross-sectional digital images comprises a plurality of computerized tomography images (col. 4 lines 25-27: "*...a CT image generating section 23 for forming three-dimensional image information from a series of tomographic image data...*").

Regarding claims 21 and 45, Takagi teaches the 3-D digital images of a corresponding cross-sectional digital image group comprises 3-D computerized tomography images (col. 4 lines 25-27: "*...a CT image generating section 23 for forming three-dimensional image information from a series of tomographic image data...*").

Regarding claims 22 and 46, Takagi fails to teach the limitations. Claus teaches displaying at least a portion of the resultant 3-D digital image on a display monitor (¶ 0051 lines 1-10: "*...more than one reconstructed data set or volume may present at one time...For example, reconstructed volumes corresponding to different "states" of the imaged anatomy may be concurrently maintained.*" and ¶ 0053 lines 1-2: "*The reconstructed three-dimensional image may be displayed by a volume rendering technique on a display 42...*"). The motivation to combine the teachings of Takagi and Claus is equivalent to the motivation of claim 1.

Regarding claims 23 and 47, Takagi fails to teach the limitations. Claus teaches displaying a 2-D portion of the resultant 3-D digital image on a display monitor (¶ 0051 lines 1-7 and ¶ 0053 lines 1-2). The motivation to combine the teachings of Takagi and Claus is equivalent to the motivation of claim 1.

Regarding claims 24 and 48, Takagi fails to teach the limitations. Claus teaches color coding a portion of the resultant 3-D digital image, and displaying the color-coded resultant 3-D digital image on a display monitor (¶ 0053 lines 1-16: "*The reconstructed three-dimensional image may be displayed by a volume rendering technique on a display 42…The display 42 may be a multi-color display or a gray-scale display that allows the use of color or gray-scale intensity…to differentiate bone and soft tissue, or contrast agent and soft tissue, or the current fluoroscopic image from the volume rendering.*"). The motivation to combine the teachings of Takagi and Claus is equivalent to the motivation of claim 1.

Regarding claims 25 and 49, Takagi fails to teach the limitations. Claus teaches displaying the resultant 3-D digital image on a display monitor using a volume rendering technique (¶ 0053 lines 1-2: "*The reconstructed three-dimensional image may be displayed by a volume rendering technique on a display 42…*"). The motivation to combine the teachings of Takagi and Claus is equivalent to the motivation of claim 1.

Regarding claim 26, Takagi teaches a system for generating a digital image indicative of an internal anatomy of a person (col. 3 lines 34-50), comprising a respiratory monitoring device generating a first signal indicative of a respiratory state of the person (col. 7 lines 2-21: "…*a device for outputting a signal indicating a breath period of the lung is provided…used for examination of an object having an element which is disposed inside the object and which*

performs periodic and repetitive movement."), a scanning device configured to scan an internal anatomy of the person to obtain scanning data (col. 3 lines 21-26: "...*a scan control section for controlling drive of the X-ray source and the rotary member so that the rotary member rotates to thereby perform scan on the periphery of the object with the X-rays in a direction of a sliced face crossing a body axis of the object...*"), and a computer 20 operably coupled to both the respiratory monitoring device 50 and the scanning device 10 (Fig. 1), configured to generate a plurality of cross-sectional digital images based on the scanning data (col. 3 lines 26-30: "...*an image reconstituting section for generating a slice image signal of the object on the basis of an output signal of the X-ray detector obtained during the scan...*"). Though Takagi does not specifically teach generating first and second cross-sectional digital image groups associated with respective first and second respiratory states, the quantity of the cross-sectional digital image groups does not depart from the scope of invention (applicant's Specification: ¶ 0061 lines 1-13), therefore no specific quantity of cross-sectional digital image groups may be generated. Therefore the teachings of Takagi enable generation of first, second, or other subsequent groups of cross-sectional digital images, in which each respective group of images corresponds to a particular respiratory state (col. 6 lines 55-58: "...*to establish a synchronizing relation of phase between the CT scan...and the cardiac pulsation to thereby obtain a plurality of CT images corresponding to one and the same phase of pulsation.*"). Takagi also teaches generating 3-D digital images, where each digital image is determined from a respective cross-sectional digital image group (col. 6 lines 60-63: "...*a three-dimensional image or a sagittal (coronal) reconstituted image is formed from a plurality of CT images obtained by scan synchronously with the period of the electrocardiographic complex...*"). However, Takagi fails to teach

processing the plurality of 3-D digital images to obtain a resultant 3-D digital image indicating positions of at least a portion of the internal anatomy of the person during at least the respiratory cycle. Claus teaches generating a resultant 3-D digital image indicating positions of at least a portion of the internal anatomy of the person (¶0051 lines 1-10: "*...several reconstructed datasets can co-exist...to...maintain a reconstructed volume for different cardiac states or phases...*", ¶0054 lines 1-6: "*...the volume rendering may be rotated...around the viewing direction...the...viewpoint...defines the viewing angle for three-dimensional rendering.*" and ¶0056 lines 1-3: "*...the three-dimensional image may be viewed from any perspective, it may be useful to rotate the volume rendering to provide the best view...*"), where a generated resultant volume is displayed in a volumetric 3D space, in which rotation of the volume is enabled to provide various 3D views of the related portions of respiratory phases or states that concurrently reside within the resultant volume. Claus also teaches storing all data generated by the computer(36) (Fig. 1), into a memory device (¶ 0015 lines 1-3), therefore the resultant 3-D images (¶ 0051 lines 1-10) would be stored in a memory device. It would have been obvious to one of ordinary skill in the art at the time of invention to combine the teachings of Takagi with Claus because this combination would improve the analysis of an internal anatomy of a subject during a respiratory cycle through enabling generation of a 3-D volumetric image associated with the entire respiratory cycle to supply complete analysis of the internal anatomy in a volumetric environment providing several views of the anatomy while avoiding visual artifacts caused by movement or displacement of the subject.

Regarding claim 50, Takagi illustrates an article of manufacture 10 (Fig. 1), scanning the internal anatomy of the person at a plurality of positions along an axis to obtain scanning data

(col. 3 lines 21-26), wherein the scanning at each position is performed over at least one respiratory cycle of the person (col. 3 lines 30-33: "*...and a scan speed control section for receiving an electrocardiogram signal of the object to thereby control a rotational speed of the rotary member on the basis of the electrocardiogram signal.*" and in col. 7 lines 2-21: "*...a signal indicating a breath period of the lung is provided in place of the electrocardiograph 50, and the X-ray scan speed in the lung region is controlled synchronously with the breath period of the lung to thereby obtain a clear CT images of the lung without any distortion...used for examination of an object having an element which is disposed inside the object and which performs periodic and repetitive movement.*"), which is performed on a computerized apparatus (col. 3 lines 5-6) and is therefore executed using some instructions or program code. Takagi also teaches generating a plurality of cross-sectional digital images based on the scanning data (col. 3 lines 26-30: "*...an image reconstituting section for generating a slice image signal of the object on the basis of an output signal of the X-ray detector obtained during the scan...*"). Though Takagi does not specifically teach generating first and second cross-sectional digital image groups associated with respective first and second respiratory states, the quantity of the cross-sectional digital image groups does not depart from the scope of invention (applicant's Specification: ¶0061 lines 1-13), therefore no specific quantity of cross-sectional digital image groups may be generated. Therefore the teachings of Takagi enable generation of first, second, or other subsequent groups of cross-sectional digital images, in which each respective group of images corresponds to a particular respiratory state (col. 6 lines 55-58: "*...to establish a synchronizing relation of phase between the CT scan...and the cardiac pulsation to thereby obtain a plurality of CT images corresponding to one and the same phase of pulsation.*"). Takagi

teaches generating a plurality of 3-D digital images, wherein each digital image of the plurality of 3-D digital images is determined from a corresponding one of the plurality of cross-sectional digital image groups (col. 6 lines 60-63: "...*a three-dimensional image or a sagittal (coronal) reconstituted image is formed from a plurality of CT images obtained by scan synchronously with the period of the electrocardiographic complex*..."). However, Takagi fails to teach a computer storage medium having computer code encoded therein for generating a digital image indicative of an internal anatomy and processing the 3-D digital images to obtain a resultant 3-D digital image indicating a portion of the internal anatomy of the person. Claus teaches a computer storage medium having computer code encoded therein (¶ 0015 lines 1-13), for generating a digital image indicative of an internal anatomy (¶ 0051 lines 1-10), therefore the scanning and image generation is performed using the computer code stored on the computer storage medium. Claus also teaches processing the plurality of 3-D digital images to obtain a resultant 3-D digital image indicating at least a portion of the internal anatomy of the person (¶0051 lines 1-10: "...*several reconstructed datasets can co-exist...to...maintain a reconstructed volume for different cardiac states or phases*...", ¶0054 lines 1-6: "...*the volume rendering may be rotated...around the viewing direction...the...viewpoint...defines the viewing angle for three-dimensional rendering.*" and ¶0056 lines 1-3: "...*the three-dimensional image may be viewed from any perspective, it may be useful to rotate the volume rendering to provide the best view*..."), where a generated resultant volume is displayed in a volumetric 3D space, in which rotation of the volume is enabled to provide various 3D views of the related portions of respiratory phases or states that concurrently reside within the resultant volume. Claus also teaches storing all data generated by the computer(36) illustrated in Fig. 1, into a memory device

(¶ 0015 lines 1-3), therefore the resultant 3-D images (¶ 0051 lines 1-10) would be stored in a memory device. It would have been obvious to one of ordinary skill in the art at the time of invention to combine the teachings of Takagi with Claus because this combination would improve the analysis of an internal anatomy of a subject during a respiratory cycle through enabling generation of a 3-D volumetric image associated with the entire respiratory cycle to supply complete analysis of the internal anatomy in a volumetric environment providing several views of the anatomy while avoiding visual artifacts caused by movement of the subject.

Claims 6 and 31 are rejected under 35 U.S.C. 103(a) as being unpatentable over Takagi in view of Claus in further view of Caoili et al. (hereinafter "Caoili", "*Urinary Tract Abnormalities: Initial Experience with Multi–Detector Row CT Urography*").

Regarding claims 6 and 31, Takagi fails to teach the limitations. Claus teaches processing several 3D digital images to obtain a resultant 3D digital image (¶0051 lines 1-10). However, Takagi and Claus fail to teach perform an average intensity projection of the plurality of 3D digital images to obtain the resultant 3D digital image. Caoili teaches performing an average intensity projection of 3D images (pg. 354 2nd col. 2nd ¶ lines 9-22: "*The 3D reconstructions...were created with...average intensity projection (AIP), and volume-rendering algorithms...the volume-rendered images were chosen to preferentially show enhanced soft tissue and contrast-opacified structures.*"). Therefore it would have been obvious to one of ordinary skill in the art at the time of invention to combine the teachings of Takagi, Claus and Caoili because this combination would improve the visualization of a resultant 3D digital image

containing data related to several respiratory phases through utilizing an average intensity projection to enhance the contrast of the image.

Claim 17 is rejected under 35 U.S.C. 103(a) as being unpatentable over Takagi in view of Claus, in further view of Yanof et al. (hereinafter "Yanof", US 2003/0188757).

Regarding claim 17, Takagi and Claus fail to teach the limitations. However, Yanof teaches scanning the internal anatomy of the person comprises monitoring a position on a chest of the person during respiration by the person to determine the time period of the respiratory cycle of the person (¶ 0035 lines 1-9: "*The respiratory monitor system 12 includes a respiratory sensor 20 preferably formed as a belt 22 adapted for attachment around the abdomen or chest of a patient...the respiratory sensor 20 includes an air bellows sensor and pressure transducer...for generating a signal corresponding to the displacement of a patient's abdomen during respiration.*", Fig. 1: element 22). Therefore it would have been obvious to one of ordinary skill in the art at the time of invention to combine the teachings of Takagi, Claus and Yanof because this combination would provide accurate rendering of 3-D images associated with respiratory states or phases of a person through synchronizing the capture of the 3-D data in response to a monitored respiratory cycle of the subject, thereby reducing obscurities and inaccuracies in the generated 3-D images.

Claims 18, 20, 42 and 44 are rejected under 35 U.S.C. 103(a) as being unpatentable over Takagi in view of Claus, in further view of Yao.

Regarding claims 18 and 42, Takagi and Claus fail to teach the limitations. However, Yao teaches at least a portion of the internal anatomy of the person comprises a tumor, or cancerous growth (¶ 0076 lines 1-6: "*...features of interest can include those features that require further review by a human reviewer...features of interest can include cancerous or pre-cancerous growths, lesions, polyps, and the like.*"). Therefore it would have been obvious to one of ordinary skill in the art at the time of invention to combine the teachings of Takagi, Claus and Yao because this combination would provide a user with the capability to visualize three-dimensional images of internal anatomies, including specific regions of interest, such as cancerous growths, in which the anatomies may then be visualized and interfaced in a three-dimensional environment providing several views of structures within the anatomy, thereby improving the analysis and discovery of potentially life-threatening areas within the volumetric image during a respiratory cycle.

Regarding claims 20 and 44, Takagi, Claus and Brandl fail to teach the limitations. However, Yao teaches the plurality of cross-sectional digital images comprises a plurality of magnetic resonance images (¶ 0087 lines 1-6: "*Imaging includes any techniques for obtaining an image of the inside of a body...Imaging includes...magnetic fields (such as MRI).*"). The motivation to combine the teachings of Takagi, Claus, Yao is equivalent to the motivation of claim 18.

Allowable Subject Matter

Claims 2-5, 7-15, 27-30 and 32-41 are objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

Regarding claims 2 and 27, Takagi fails to teach the imitations. Claus teaches generation of a resultant 3-D digital image (¶0051 lines 1-7), however the prior art does not teach performing a minimum intensity projection of the first and second digital 3-D digital images to obtain the resultant 3-D digital image, therefore claims 2-3 and 27-28 have been objected to as being dependent upon a rejected base claim.

Regarding claims 4 and 29, Takagi fails to teach the imitations. Claus teaches generation of a resultant 3-D digital image (¶0051 lines 1-7), however the prior art does not teach performing a maximum intensity projection of the first and second digital 3-D digital images to obtain the resultant 3-D digital image, therefore claims 4-5 and 29-30 have been objected to as being dependent upon a rejected base claim.

Regarding claims 7 and 32, Takagi fails to teach the imitations. Claus teaches generation of a resultant 3-D digital image (¶0051 lines 1-7), however the prior art does not teach performing a maximum intensity projection of the first and second 3-D digital images to obtain a third 3-D digital image, generating a boundary within the third 3-D digital image around a predetermined portion of the internal anatomy of the person, performing a minimum intensity projection of the predetermined portion of the third 3-D digital image to obtain a fourth digital image, and combining the third 3-D digital image and the fourth 3-D digital image to obtain the

resultant 3-D digital image, therefore claims 7-11 and 32-36 have been objected to as being dependent upon a rejected base claim.

Regarding claims 12 and 37, Takagi fails to teach the imitations. Claus teaches generation of a resultant 3-D digital image (¶0051 lines 1-7), however the prior art does not teach performing a minimum intensity projection of the first and second 3-D digital images to obtain a third 3-D digital image, generating a boundary within the third 3-D digital image around a predetermined portion of the internal anatomy of the person, performing a maximum intensity projection of the predetermined portion of the third 3-D digital image to obtain a fourth digital image, and combining the third 3-D digital image and the fourth 3-D digital image to obtain the resultant 3-D digital image, therefore claims 12-15 and 37-41 have been objected to as being dependent upon a rejected base claim.

(10) Response to Argument

The appellant argues in section A. i. of the arguments that since the prior art reference Takagi, used in the 35 U.S.C. 103(a) rejection of claims 1, 19, 21-26, 43 and 45-50, already teaches generating a 3-D image based on a plurality of 2-D CT images, one skilled in the art would have no motivation to combine the teachings of Claus with Takagi to obtain a 3-D image. However, Claus was not relied upon to teach generation of 3-D images from 2-D images, but was relied upon to teach generation of a resultant 3-D image containing a portion of a first and second 3-D image, therefore it would have been obvious to one of ordinary skill in the art at the time of invention to combine the teachings of Takagi, which provides generation of a 3-D images corresponding to a respiratory state (col. 6 lines 60-63), with the teachings of Claus, which

provides generation of a resultant 3-D image containing a portion of 3-D images associated with respiratory states (¶0051 lines 1-7), because this combination would provide improvement to the analysis of the internal anatomy of a subject during a respiratory cycle through enabling generation of a 3-D volumetric image associated with the complete respiratory cycle to supply a complete analysis of the internal anatomy in a volumetric environment providing several views of the anatomy while avoiding visual artifacts caused by movement or displacement of the subject (¶0051 lines 1-10: "*...several reconstructed datasets can co-exist...to...maintain a reconstructed volume for different cardiac states or phases...*" and ¶0056 lines 1-3: "*...the three-dimensional image may be viewed from any perspective, it may be useful to rotate the volume rendering to provide the best view...*").

The appellant also argues in section A. ii. of the arguments that Takagi and Claus fail to teach generating a resultant 3-D digital image including at least a portion of the internal anatomy of the person utilizing the first and second 3-D digital images. However, Claus teaches generating a resultant 3-D digital image including at least a portion of the internal anatomy of the person utilizing the first and second 3-D digital images (¶0051 lines 1-10: "*...several reconstructed datasets can co-exist...to...maintain a reconstructed volume for different cardiac states or phases...*", ¶0054 lines 1-6: "*...the volume rendering may be rotated...around the viewing direction...the...viewpoint...defines the viewing angle for three-dimensional rendering.*" and ¶0056 lines 1-3: "*...the three-dimensional image may be viewed from any perspective, it may be useful to rotate the volume rendering to provide the best view...*"), where a generated resultant volume is displayed in a volumetric 3D space, in which rotation of the volume is

enabled to provide various 3D views of the related portions of respiratory phases or states that concurrently reside within the resultant volume.

The appellant's arguments argues in section B. with respect to claims 2, 4, 27 and 29 are persuasive, therefore the rejection of claims 2, 4, 27 and 29 under 35 U.S.C. 103(a) as being unpatentable over Takagi in view of Claus in further view of Brandl has been withdrawn.

The appellant argues in section C. of the arguments that the prior art reference Yao, used in the 35 U.S.C. 103(a) rejection of claims 3, 5, 7-15, 28, 30 and 32-41 does not teach generating a resultant 3-D digital image indicating at least a portion of the internal anatomy of the person utilizing the first and second 3-D digital images to obtain the resultant 3-D digital image. However, Claus teaches generating a resultant 3-D digital image including at least a portion of the internal anatomy of the person utilizing the first and second 3-D digital images (¶0051 lines 1-10: "*...several reconstructed datasets can co-exist...to...maintain a reconstructed volume for different cardiac states or phases...*", ¶0054 lines 1-6: "*...the volume rendering may be rotated...around the viewing direction...the...viewpoint...defines the viewing angle for three-dimensional rendering.*" and ¶0056 lines 1-3: "*...the three-dimensional image may be viewed from any perspective, it may be useful to rotate the volume rendering to provide the best view...*"), where all portions of the respiratory phases are displayed within a 3D volumetric display space, in which the generated resultant volume is enabled with rotation to provide various 3D views of the related portions of respiratory phases within the resultant volume.

The appellant argues in section D. of the arguments that Caoili used in the 35 U.S.C. 103(a) rejection of claims 6 and 31 does not teach generating a resultant 3-D digital image indicating at least a portion of the internal anatomy of the person utilizing the first and second 3-

D digital images to obtain the resultant 3-D digital image. However, Claus was relied upon to teach generating a resultant 3-D digital image including at least a portion of the internal anatomy of the person utilizing the first and second 3-D digital images (¶0051 lines 1-10: "*...several reconstructed datasets can co-exist...to...maintain a reconstructed volume for different cardiac states or phases...*", ¶0054 lines 1-6: "*...the volume rendering may be rotated...around the viewing direction...the...viewpoint...defines the viewing angle for three-dimensional rendering.*" and ¶0056 lines 1-3: "*...the three-dimensional image may be viewed from any perspective, it may be useful to rotate the volume rendering to provide the best view...*"), where a generated resultant volume is displayed in a volumetric 3D space, in which rotation of the volume is enabled to provide various 3D views of the related portions of respiratory phases or states that concurrently reside within the resultant volume.

The appellant argues in section E. of the arguments that the prior art reference Yanof used in the 35 U.S.C. 103(a) rejection of claim 17 does not teach generating a resultant 3-D digital image indicating at least a portion of the internal anatomy of the person utilizing the first and second 3-D digital images to obtain the resultant 3-D digital image. However, Claus was relied upon to teach generating a resultant 3-D digital image including at least a portion of the internal anatomy of the person utilizing the first and second 3-D digital images (¶0051 lines 1-10: "*...several reconstructed datasets can co-exist...to...maintain a reconstructed volume for different cardiac states or phases...*", ¶0054 lines 1-6: "*...the volume rendering may be rotated...around the viewing direction...the...viewpoint...defines the viewing angle for three-dimensional rendering.*" and ¶0056 lines 1-3: "*...the three-dimensional image may be viewed from any perspective, it may be useful to rotate the volume rendering to provide the best*

view…"), where the 3D volumetric display space concurrently displays portions of the respiratory phases to enable rotation of the volume, thereby providing various 3D orientations and views of the phases within the resultant volume.

The appellant argues in section F. of the arguments that the prior art reference Yao used in the 35 U.S.C. 103(a) rejection of claims 18, 20, 42 and 44 does not teach generating a resultant 3-D digital image indicating at least a portion of the internal anatomy of the person utilizing the first and second 3-D digital images to obtain the resultant 3-D digital image. However, Claus was relied upon to teach generating a resultant 3-D digital image including at least a portion of the internal anatomy of the person utilizing the first and second 3-D digital images (¶0051 lines 1-10: "*…several reconstructed datasets can co-exist…to…maintain a reconstructed volume for different cardiac states or phases…*", ¶0054 lines 1-6: "*…the volume rendering may be rotated…around the viewing direction…the…viewpoint…defines the viewing angle for three-dimensional rendering.*" and ¶0056 lines 1-3: "*…the three-dimensional image may be viewed from any perspective, it may be useful to rotate the volume rendering to provide the best view…*"), where the portions of the respiratory phases are displayed together within a 3D volumetric display space to enable rotation of the volume, thereby providing various 3D orientations and views of the phases within the resultant volume.

(11) Related Proceeding(s) Appendix

No decision rendered by a court or the Board is identified by the examiner in the Related Appeals and Interferences section of this examiner's answer.

For the above reasons, it is believed that the rejections should be sustained.

Respectfully submitted,

Said Broome Said Broome

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Ulka Chauhan, Supervisory Patent Examiner

Mark Zimmerman, Supervisory Patent Examiner

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